with the addition that the round ligament is included in the ligatures that approximate Poupart's ligament and the conjoined tendon.

The ilio-inguinal nerve must not be included in or pressed on by sutures used in operative work in the inguinal canal.

The cremasteric and the infundibuliform fasciae are so thin and so intimately adherent to the hernial sac that they can almost be considered, from a surgical standpoint, a part of the hernial sac.

[For discussion see JOURNAL, May, page 161.]

URETERO-CYSTOSTOMY, WITH REPORT OF CASE.*

By J. HENRY BARBAT, M. D., San Francisco.

THE implantation of the ureter into the bladder is an operation which has been practiced since 1877, the first recorded operation being done by Tauffer. Up to the present time there have been about 120 cases recorded, with a mortality of 6 per cent. About 20 per cent of these cases were due to vaginal hysterectomies, 10 per cent were congenital, 10 per cent followed labor, with or without forceps, and the rest resulted from severing the ureter accidentally or intentionally during the course of abdominal sections. However caused, severance of the ureter in the lower part of its course requires its implantation into the bladder, because it is impossible to do a uretero-ureteral anastomosis in the deep portion of the pelvis. In a number of cases in which uretero vaginal fistulae existed it has been found possible to turn the cut end of the ureter into the base of the bladder by working through the vagina, first making a vesico-vaginal fistula and then dissecting a flap of vagina around one side of the cut end of the ureter, turning it into the incision in the bladder and suturing it in position. In most of the cases reported good results were obtained, and the method is to be commended whenever feasible.

In a large number of cases it will be found impracticable to work by the vaginal route, and in these cases it will be found necessary to open the abdomen, search for the ureter and implant it into the bladder. Several methods have been suggested and employed with success, the majority of the patients being restored to a condition of comfort so far as the ureter and bladder were concerned, and cystoscopic examinations subsequent to the operations showed the ureters to be patulous.

I believe the unusually large proportion of reported successful cases is due to the fact that many men report only their successes, in order not to injure their records. The only unsuccessful cases reported are by the most expert operators with a vast amount of clinical material at their disposal. I mention this because I know of unreported cases; the patients have been operated upon without success, and still have their uretero-vaginal fistulae.

In uretero-cystostomy the technic must be simple, must not occupy too much time, and the ureter must be so implanted that there will be little probability of its cut end contracting or of any leaking at the site of the implantation. Contraction of the end of the ureter can be prevented by splitting it in two flaps, as suggested by Paoli, Busacchi, Kelly, Baldy and others. Leakage at the site of anastomosis must be prevented, first by making the opening in the bladder no larger than necessary to allow the ureter to be drawn through without force; second by fixing the end of the ureter into the bladder wall in such a manner that there will be little or no tension on the sutures which cover the ureter with peritoneum.

After a number of operations on dogs, the following technic was adopted as the most satisfactory in every way: After the abdomen is opened the ureter is sought for and tied as near to the bladder as possible, and then cut on the proximal side of the ligature. Care must be taken to not separate the ureter for too great a distance from the surrounding tissues, otherwise its blood supply will be jeopardized. A long silver probe or a uterine sound is passed into the bladder through the urethra, and pushed as far as possible toward the cut end of the ureter. This shows us the part of the bladder which will approach the nearest to the ureter, and thereby avoid tension after union. When the exact point is noted, the sound is withdrawn for one centimeter and a half, so that the opening in the mucosa will come that distance farther toward the pubes in the wall of the bladder. This enables us to cover over the lower part of the ureter with a layer of peritoneum from the bladder without having too much tension. I mention this point especially, because if the opening in the mucosa is made at the highest point of the bladder, it will be found difficult to make a collar of peritoneum to envelop the lower end of the ureter without making undue traction on it.

A small incision is carefully made on the tip of the sound down to the mucus membrane of the bladder, which is to be picked up with fine mouse-toothed forceps before it is cut, in order to prevent it from retracting beyond the margin of the puncture. A fine intestinal needle, threaded with chromacized catgut, is now passed through the bladder wall from without in at a point a trifle over one centimeter from the edge of the cut in the bladder, and a little to one side of a line perpendicular to the center of the incision. The needle is brought out through the cut, and is now passed through one of the flaps of the ureter from without in, close to one corner, then back through the other corner from within out. One motion is usually sufficient to pass the needle through the ureter twice. I now pass the needle into the bladder through the cut, being careful to avoid catching the mucus membrane on the point, making it emerge at a point corresponding to the point of beginning. Care must be taken in making this last move to see that the point of the needle enters the mucosa directly under its point of emergence, as it is very easy to start it obliquely at a point close to the margin of the incision, and this would be fatal to the proper completion of the operation.

The threads are left long, and a stitch is taken on the other side of the cut with another needle in exactly the same manner, being careful not to get the threads crossed at the opening in the bladder. When both sutures are placed, both ends of both sutures are pulled on simultaneously and the ureteral flaps are drawn into the bladder; when the threads are tied, the outer side of the ureteral flaps are in contact with the mucus membrane of the bladder, and the top of the slit in the ureter is well inside of the bladder. The peritoneum covering the bladder is now slit for one and a half centimeters, just behind the ureter, and the cut edges drawn over the lower end and sutured with fine catgut, picking up a small bite of the ureteral wall without perforating its lumen. Three such stitches are sufficient. Great care must be observed in placing these sutures to avoid making too much pressure on the ureter; this may be prevented by picking up only peritoneum, which, being somewhat loose, will easily give, and thereby avert obstruction.

If any tension exists at the point of anastomosis, the best way to relieve it is to take a number of anchor sutures, beginning at some distance from the insertion of the ureter into the bladder, and working down to it. The sutures should be taken in both ureter and bladder, and so placed that each suture takes up a little of the tension. There must be no tension on the sutures which hold the peritoneum over the lower end of the ureter at its junction with the bladder, or there will be danger of leakage.

*Read at the Thirty-fourth Annual Meeting of the State Society, Paso Robles, April 19-21, 1904.

Cases will be met with in which the ureter and bladder cannot be brought together without undue traction, and will demand good judgment and skill to surmount the difficulty. In one case Howard Kelly loosened the bladder from its anterior attachments, and in that way gained three centimeters. Loosening the kidney from its bed will also give about three or four centimeters, and if necessary both procedures might be resorted to, thereby obtaining an approximation of from six to seven centimeters. If this is not sufficient, we must resort to the more difficult and serious operation of using a piece of isolated intestine to bridge over the gap between the ureter and the bladder, as advised and done experimentally by Fabri, D'Urso and myself.

The following patient was operated upon on account of a uretero-vaginal fistula following vaginal hysterectomy:

Mrs. R., aged 28 years, nullipara, had noticed a lump in the left lower abdomen for several months, which appeared and disappeared without any apparent reason, but did not cause any pain.

In September, 1903, while on a visit to Portland, she was taken suddenly sick with chills and fever and violent pain in the lower abdomen. The physician who saw her made a diagnosis of pus tube and fibroid tumors of the uterus. The patient was removed to the hospital and operated upon. Several pus sacs were said to have been evacuated, and the uterus removed per vaginam on account of two small fibroids. Six days after the hysterectomy which was done with clamps, fecal matter began to pass per vaginam, and continued for ten days, when it almost stopped; but urine began to flow at about that time, and continued to do so until the time I operated on her, November 14, 1903.

Examination made the day before operation showed two large fluctuating masses in the pelvis, the left one being larger than the right, neither being very tender to the touch. Vaginal examination disclosed the absence of the cervix, and on the left side of the vault a small opening about two centimeters deep, funnel-shaped and bleeding on being touched. Urine was seen flowing from the bottom of the cavity. Attempts to pass fine bougies or ureteral catheters were futile, and only provoked bleeding and caused pain. On the posterior vaginal wall at the margin of the wound was a small papilla, beneath which a fine probe could be passed into the rectum. Cystoscopic examination showed urine flowing from the right ureter, but none from the left, and a ureteral sound could be passed only for a distance of one centimeter into the left ureteral orifice. The bladder at the site of the left ureter was pulled toward the back and left side, undoubtedly by cicatricial contraction. The urine collected from the vagina for one hour measured one ounce, and the same amount was drawn from the bladder during the same time. The patient had been taking hexamethylene tetramine for four days, and urine passed from the vagina one hour after the administration of a formalin douche 1-1000 showed no bacteria either by culture or centrifuge, so I concluded that there was as yet no ascending infection. This was remarkable on account of the fact that, even though fecal matter did not pass through the rectal fistula, gas did; and colored solutions injected into the vagina passed into the rectum, showing a valve-like arrangement at the recto-vaginal fistula. This fact made it impracticable to attempt any operation through the vagina; and further, the large masses in the pelvis were better attacked through the abdomen.

The operation was done just two months from the first one. The abdomen was opened in the median line, and it was seen at a glance that the masses were ovarian in character, because the tubes were both intact and lay on top of the tumors. The left one was firmly adherent, and every time an adhesion was separated a pus sac was opened, and near the bottom of the pelvis a small cyst was broken into. Great difficulty was experienced in separating the mass from the cicatricial tissue left from the previous operation, and some of the sac wall had to be left in.

The tumor on the right side was a cyst as large as the fist, and was easily removed. The tissues of the pelvis which were in contact with the tumor of the let side were thoroughly wiped with pads wrung out of formalin solution 1-1000. Search was then made for the left ureter, which proved somewhat deceptive on account of its large size, looking more like the external iliac vein than a ureter, and it was only after finding the vessels a little on one side that I felt sure of the ureter. It was fully one centimeter in diameter. It was dissected down as far as possible without opening the vagina, and a ligature placed at the lowest point. The ureter was cut just above the ligature, and implanted into the bladder in the manner previously described.

There was very little tension at the point of anastomosis and no anchor sutures were required. The abdomen was closed without drainage, and the patient put to bed, with the head of the bed elevated eighteen inches. A catheter was kept in the bladder for forty-eight hours, the urine being slightly bloody during that period. After that time it discommoded the patient so much that I withdrew it, and ordered the patient to be catheterized every three hours. She felt able to pass water without assistance, however, and was allowed to do so. The amount of urine passed rapidly reached normal, and even exceeded it, and was passed without difficulty, with the exception that the patient felt slight pain at the end of micturition, at a spot corresponding to the point of anastomosis. No bacteria were found at any time subsequent to the operation.

The recto-vaginal fistula was closed at a subsequent operation, and the patient is at the present time in the full enjoyment of perfect health.

Cystoscopic examination two months after implantation of the ureter showed a small dimple at the point of insertion, from which urine could be seen flowing. The ureteral orifice was rather small, barely admitting the tip of a Kelly searcher, but evidently sufficiently patulous to allow the urine to enter the bladder without any obstruction.

The ureteral flaps were not discernable, and this is in accord with my experimental work, which has shown in every instance that the flaps either unite so closely with the bladder wall as to be invisible or else the ureter pulls them up along with the wall, leaving only a dimple to be seen after the lapse of a few months.

[For discussion see May JOURNAL, page 162.]

EXTRACTS FROM RECENT LITERATURE ON FOURTH OF JULY TETANUS.*

By FRANCES LOUISE NEWTON, M. D., Woodland.

I HAVE, from my earliest recollections, been interested in tetanus. The children that I knew warned each other against stepping on a rusty nail for fear of lockjaw, just as they taught each other the kinds of mushrooms that were poisonous and those that were edible. My interest has been much increased within the past year by the numerous articles that have appeared in the medical journals upon the subject, especially *The Journal of the American Medical Association*, whose attention was attracted by the appalling loss of life through the celebration of the Fourth of July recorded in the daily papers throughout the country. Warnings were not wanting, for the newspapers retold the experiences of previous years; how many lives were lost through accidents of the Fourth, and how many more had succumbed to the tetanus epidemic that follows in its train. Parents were warned both of the dangers in the use of toy pistols and the necessity of the proper care of the wounds that they might produce. The responsibility of municipal authorities was pointed out. Attention was called to innumerable ordinances controlling the sale of toy pistols to minors and the discharge of firearms within the city limits of the municipality. Assertions were made that if existing laws were enforced by the police, the events of preceding years could be modified, if not eliminated.

Nor has the public alone been warned. Hardly a medical journal in the country failed to speak of the topic at the approach of the Fourth, both last year and this, and to urge the necessity of thorough surgical treatment of blank cartridge wounds, as well as the desirability of the prophylactic use of antitoxin. Much credit is due the *Journal* for investigating and tabulating the results of the accidents that occurred all over the United States from celebrating the Fourth last year. The list of dead and injured will probably not be any less this year.

ACCIDENTS ON JULY 4, 1903.

Deaths from tetanus	406
Deaths from other causes	60
Non-fatal injuries	3,983
Total persons dead or injured	4,449
Tetanus cases from blank cartridges	363
Tetanus cases from all other known causes	29
Other injuries from blank cartridges and fireworks	2,461
Other injuries from fireworks, powder, cannon, and all other known causes	1,364

*Read before the Yolo County Society for Medical Improvement.